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RCS: DD-A&T(Q&A)823-424



MQ- 9 Reaper Unmanned Aircraft System (MQ-9 Reaper)

As of FY 2021 President's Budget

Defense Acquisition Management Information Retrieval (DAMIR)

This document contains information that may be exempt from mandatory disclosure under the FOIA.

Table of Contents

Common Acronyms and Abbreviations for MDAP Programs	derenting the section of the section
Program Information	
Responsible Office	
References	
Mission and Description	**************************************
Executive Summary	
Threshold Breaches	
Schedule	
(U// FOUO) Performance	
Track to Budget	18
Cost and Funding	19
Charts	3:
Risks	33
Low Rate Initial Production	35
Foreign Military Sales	
Nuclear Costs	37
Unit Cost	38
Cost Variance	4
(U//FQUQ) C ontracts	45
Deliveries and Expenditures	
Operating and Support Cost	

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance

ACAT - Acquisition Category

ADM - Acquisition Decision Memorandum

APB - Acquisition Program Baseline

APPN - Appropriation

APUC - Average Procurement Unit Cost

\$B - Billions of Dollars

BA - Budget Authority/Budget Activity

Blk - Block

BY - Base Year

CAPE - Cost Assessment and Program Evaluation

CARD - Cost Analysis Requirements Description

CDD - Capability Development Document

CLIN - Contract Line Item Number

CPD - Capability Production Document

CY - Calendar Year

DAB - Defense Acquisition Board

DAE - Defense Acquisition Executive

DAMIR - Defense Acquisition Management Information Retrieval

DoD - Department of Defense

DSN - Defense Switched Network

EMD - Engineering and Manufacturing Development

EVM - Earned Value Management

FOC - Full Operational Capability

FMS - Foreign Military Sales

FRP - Full Rate Production

FY - Fiscal Year

FYDP - Future Years Defense Program

ICE - Independent Cost Estimate

IOC - Initial Operational Capability

Inc - Increment

JROC - Joint Requirements Oversight Council

\$K - Thousands of Dollars

KPP - Key Performance Parameter

LRIP - Low Rate Initial Production

\$M - Millions of Dollars

MDA - Milestone Decision Authority

MDAP - Major Defense Acquisition Program

MILCON - Military Construction

N/A - Not Applicable

O&M - Operations and Maintenance

ORD - Operational Requirements Document

OSD - Office of the Secretary of Defense

O&S - Operating and Support

PAUC - Program Acquisition Unit Cost

PB - President's Budget

PE - Program Element

PEO - Program Executive Officer

PM - Program Manager

POE - Program Office Estimate

RDT&E - Research, Development, Test, and Evaluation

SAR - Selected Acquisition Report

SCP - Service Cost Position

TBD - To Be Determined

TY - Then Year

UCR - Unit Cost Reporting

U.S. - United States

USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

MQ- 9 Reaper Unmanned Aircraft System (MQ-9 Reaper)

DoD Component

Air Force

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Date Assigned: October 7, 2019

References

SAR Baseline (Production Estimate)

FY 2011 President's Budget dated February 1, 2010

Approved APB

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated April 21, 2017

Mission and Description

Mission:

The MQ-9 Reaper is an armed, multi-mission, medium-altitude, long-endurance remotely piloted aircraft that is employed primarily against dynamic execution targets and secondarily as an intelligence collection asset. Given its significant loiter time, wide-range sensors, multi-mode communications suite, and precision weapons, it provides a unique capability to perform strike, coordination, and reconnaissance against high-value, fleeting, and time-sensitive targets. MQ-9s can also perform the following missions and tasks: Intelligence, Surveillance, Reconnaissance (ISR), close air support, combat search and rescue, precision strike, buddy-laser designation, convoy/raid overwatch, target development, and terminal air guidance. The MQ-9's capabilities make it uniquely qualified to conduct irregular warfare operations in support of combatant commander objectives.

Description:

The MQ-9 baseline system carries the Multi-Spectral Targeting System (MTS), which has a robust suite of visual sensors for targeting. The MQ-9's MTS is adapted for high-altitude use, integrates an infrared sensor, color/monochrome daylight TV camera, image-intensified TV camera, laser range finder/designator, and a laser illuminator. The full-motion video from each of the imaging sensors can be viewed as separate video streams or fused.

The laser range finder/designator feature precisely designates targets for employment of laser-guided munitions, such as the Guided Bomb Unit-12 Paveway II. The MQ-9 is also equipped with a Synthetic Aperture Radar that provides high resolution imagery, moving target indicator tracking, and targeting for GPS-guided munitions through cloud cover. The MQ-9 can also employ four laser-guided, Air-to-Ground Missile-114 (AGM-114) Hellfire missiles, which provide highly accurate, low-collateral damage, anti-armor and anti-personnel engagement capabilities.

An Extended Range (ER) MQ-9 variant was fielded during 2015 in response to an Air Force Urgent Operational Need. The ER variant provides a tremendous capability increase in both range and endurance, and was delivered to operational users within 18 months of receipt of the user requirement. An MQ-9 can be transformed into an MQ-9 ER through the integration of a depot-level retrofit modification package significantly extending the aircraft's maximum endurance. MQ-9's original external payload carriage configuration remains unchanged, providing the aircraft with a "mix and match" capability that allows it to carry both fuel tanks and an assortment of external weapons and other payloads.

In its secondary role as an ISR asset, the MQ-9 is part of a system that supports strike aircraft and ground commanders by acquiring and tracking dynamic targets or other useful intelligence. It is also capable of supporting a wide range of operations such as: coastal and border surveillance, weapons tracking, embargo enforcement, humanitarian/disaster assistance, support of peacekeeping, and counter-narcotic operations. Utilizing satellite communication links, the Remotely Piloted Aircraft (RPA) can acquire and pass real-time imagery data to ground users around the clock, and Beyond-Line-Of-Sight.

The RPA can be disassembled and loaded into a single container for deployment worldwide. The entire system can be transported in the C-130 Hercules, or larger aircraft. The MQ-9 aircraft operates from standard U.S. airfields with clear line-of-sight to the ground data terminal antenna, which provides line-of-sight communications for takeoff and landing. The Predator Primary Satellite Link provides over-the-horizon communications for the aircraft and sensors.

The primary concept of operations, remote split operations, employs a Launch and Recovery Element Ground Control Station for take-off and landing operations at the Forward Operating Location, while the Mission Control Element crew based in the Continental United States executes command and control of the remainder of the mission via Ku-band satellite link. Remote split operations result in a smaller number of personnel deployed to a forward location, consolidate control of the different flights in one location and, as such, simplify command and control functions as well as the logistical supply challenges for the weapon system.

Executive Summary

Program Highlights Since Last Report

MQ-9 Block 5 Performance. From June 23, 2017 (1st operational Block 5 combat line) through December 31, 2019, the Block 5 Remotely Piloted Aircraft and the Block 30 Ground Control Station (GCS) system performance has resulted in over 72,330 combat hours in 4,686 sorties, with 675 weapons successfully employed.

MQ-9 Total Flight Hours. Reaper total cumulative U.S. flight hours as of December 31, 2019 are at over 2,000,000, continuing to signify the substantial MQ-9 employment by MQ-9 Users. During calendar year 2019, MQ-9 has amassed over 333,000 total U.S. flight hours.

MQ-9 Strategic Partnership. A strategic partnership is being formed that will benefit both the Arnold Engineering Development Center (AEDC) and the MQ-9 Reaper Program. This partnership will enhance rapid MQ-9 retrofit capabilities fielding while also expediting and enhancing Developmental Test and Evaluation of U.S. hypersonic weapons. AEDC will leverage the Medium Altitude UAS Division's Southern California Logistics Airport facilities to establish its Main Operating Base to support Pacific Test Range activities, to include range clearing and hypersonic weapons characterization. The MQ-9 System Program Office will leverage AEDC's resources and SCLA footprint to create a more efficient retrofit line with increased throughput to support planned MQ-9 capability upgrades for the fleet. A Memorandum of Agreement was signed in November 2019 that solidifies roles and responsibilities of the MQ-9 and AEDC organizations who will plan and execute this proactive strategic partnership.

MQ-9 Production Deliveries. As of December 31, 2019, 116 of 195 new MQ-9 Block 5 production aircraft deliveries are complete, with production deliveries scheduled through FY 2023. The FY 2016 production contract has delivered 18 of 36 aircraft as of December 31, 2019. The MQ-9 Block 5 FY 2019 production buy for 24 additional Block 5 weapon systems was awarded on September 12, 2019, in the same year as the funding was appropriated, to help usher required updated capabilities to warfighters! The MQ-9 Team released a Request for Proposal on April 2, 2019 for the FY 2020 Agile Reaper Enterprise Solution (ARES) indefinite-delivery/indefinite-quantity, priced quantity curve production contract. The General Atomics Aeronautical Systems, Incorporated (GA-ASI) ARES proposal was received on October 31, 2019, with the ARES contract award planned by September 30, 2020.

MQ-9 Retrofit Deliveries. As of December 31, 2019, 57 of the total 118 planned MQ-9 Block 1 Extended Range (ER) retrofits were completed. The total active fleet of Block 1 ER aircraft remains at 99. During December 2019, five Block 5 ER retrofits were completed bringing the total Block 5 ER fleet to 33 aircraft.

GCS Production and Modification Deliveries. As of December 31, 2019, 54 Block 30 GCS new production cockpit deliveries have completed and 45 Block 30 GCS retrofit cockpit deliveries have been completed, yielding a total of 99 GCS Block 30s fielded.

Block 50 Ground Control Stations (GCS). ACC has made a decision that Block 50 GCS production is no longer required. The SPO has developed a way forward to smartly end the current development contract and best leverage the investment made in the Block 50 GCS. The way forward delivers five Mobile GCSs and three Fixed GCSs with a useable software baseline and documentation. These assets can be used to feed future upgrades to the MQ-9 Block 30 GCSs, and will also be used to support future UAS development.

There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation

	History of Significant Developments Since Program Initiation
Date	Significant Development Description
4th Quarter FY 2001	In response to the Global War on Terrorism, the Air Force (AF) requested Congressional support for additional MQ-1 Predator assets and improvements, including the development of the MQ-9 Reaper, then referred to as the Predator B. This request was supported through the appropriation of the Defense Emergency Response Fund (DERF) in 2001.
2nd Quarter FY 2002	The Secretary of the AF and Chief of Staff of the AF provided direction for the MQ-9 to senior AF acquisition, requirements, and operations leaders. The AF's leaders were directed to investigate near-term solutions. The DERF provided funding for initial Predator B aircraft. Subsequently, the AF received Congressional approval to proceed with production efforts and procurement of all aircraft in a turbo-prop configuration.
1st Quarter FY 2003	The AF awarded a development contract to General Atomics Aeronautical Systems Incorporated (GA-ASI) to provide engineering drawings, full documentation of the manufacturing process, additional equipment integration of sensor components, and a plan for the MIL-STD-1760 Stores Management System.
1st Quarter FY 2004	In response to a request from the Congress, the AF submitted a report that addressed the operational requirement for the Predator B, as well as a development and acquisition plan to achieving that operational requirement The AF requested investment and sustainment funding for the initiation of a Predator B program based on established user requirements. A a result of the current operational needs of that time, the AF decided to develop and test the Predator B so as to understand its capabilities and limitations prior to making a full-rate production decision.
January 2004	The program received its Milestone B decision, and was approved to proceed into the Engineering and Manufacturing Development phase of acquisition.
March 2005	Award of the Predator B System Development and Demonstration (SDD) contract was approved.
2nd Quarter FY 2006	Award of the FY 2005 production contract and the associated procurement funding were authorized by Congress. The Commander of Air Combat Command (ACC) issued a Predator B Early Fielding Decision. A Memorandum of Understanding between ACC and the Commander of the Aeronautical Systems Center was signed, accelerating the effort to move the initial Predator B combat capability configuration from development to production, delivery, and operations. By July 2006, acquisition management responsibility moved to the Predator-Reaper Aeronautical Systems Squadron (658 th AESS). In the fall of 2006, the AF officially designated the Predator B as the MQ-9 Reaper.
4th Quarter FY 2007	Award of the production contracts for the FY 2006/FY 2007 buys and the associated procurement funding were authorized by Congress. By July 2007, the 658 th AESS was designated the 703 rd Aeronautical Systems Group (AESG). The first early fielding MQ-9 aircraft was delivered to the AF and the first MQ-9 Reaper combat air patrol (CAP) was stood-up by ACC in September 2007. The second MQ-9 operational CAP was stood-up in September 2007.
2nd Quarter FY 2008	Award of the production contract for the FY 2008 buy and the associated procurement funding were authorized by the Congress. Early MQ-9 fielding was completed.
2nd Quarter FY 2009	USD(AT&L) designated the MQ-9 Reaper as a Special Interest Program, which designated the program as an Acquisition Category ID (ACAT ID) OSD oversight program. The Air Force's Major Defense Acquisition Program list officially designated the MQ-9 Reaper as an ACAT ID program.

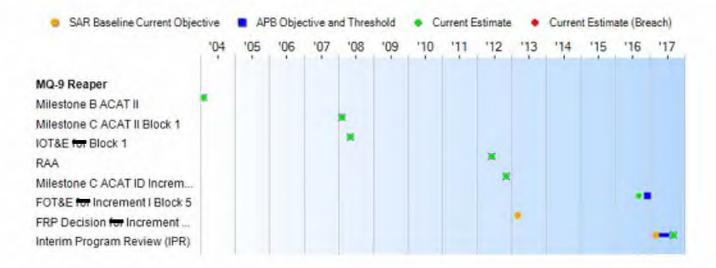
1st Quarter FY 2010	The Program Office (PO) conducted both the Preliminary and Critical Design Reviews (PDR/CDR) on the Reaper Block 5. This stabilized the Block 5 design and began the integration and test phase of the program. The AF Technical Airworthiness Authority signed the MQ-9 Reaper establishing the initial airworthiness certification basis for the MQ-9 Reaper Block 1 system.
May 2012	The MQ-9 Reaper Block 5 aircraft conducted first flight.
June 2012	The MQ-9 Reaper program met the Required Assets Available (RAA) milestone.
November 2012	The Under Secretary of the Defense for Acquisition, Technology and Logistics (USD(AT&L)) signed an Acquisition Decision Memorandum which approved Milestone C for the MQ-9 Reaper Increment I, Block 5 program and authorized entry into Low Rate Initial Production.
December 2013	The Air Force Review Board (AFRB) and the Configuration Steering Board approved the removal of the FRP milestone and replaced it with an in Progress Review following FOT&E.
3rd Quarter FY 2014	The PO successfully executed two Joint Urgent Operational Needs (JUONs). The first was for AF Special Operations Command (AFSOC) and ACC MQ-9 Reaper systems to support rapid fielding of the Afghan Enabler capabilities. The second JUON was a requirement for MQ-9 Extended Range (ER) aircraft deliveries to users. MQ-9 ER provides an extension of range and endurance which allows for increased time-on-station and mission radius. The PO was also directed by Air Force senior leadership to develop an acquisition strategy that blends the rigor of a traditional acquisition program with the agility of a Quick Reaction Capability (QRC) program to make it more responsive to warfighter requirements. This Hybrid Acquisition Strategy is a schedule-driven process designed to rapidly field mature MQ-9 capabilities. Also, the Block 50 Ground Control Station development contract was awarded that culminated in a successful Block 50 System Requirements Review during CY 2014.
March 2015	All 38 MQ-9 ER aircraft were delivered to Users on schedule.
December 2015	The Commander of ACC declared that MQ-9 Reaper Initial Operational Capability (IOC) had been achieved. The IOC declaration memorandum stated the MQ-9 Reaper has met all required IOC capabilities as outlined in the MQ-9 Increment I Capabilities Production Document.
January 2016	MQ-9 passed its 1-millionth total flight hours mark. MQ-9 remains one of the most called- upon warfighter combat assets.
3rd Quarter FY 2016	The AF Service Acquisition Executive approved the MQ-9 Reaper Hybrid Acquisition Strategy Annex to the MQ-9 Acquisition Strategy. The first procurement under this strategy was awarded in CY 2016 and will upgrade the MQ-9 Block 5 weapon system with improved video, precision strike, and numerous maintenance improvements.
May 2016	Block 50 Ground Control Station (GCS) completed Preliminary Design Review (PDR) and construction of the initial set of mobile GCS has been initiated in support of Block 50 GCS developmental tests.
September 2016	All MQ-9 Follow-on Operational Test and Evaluation (FOT&E) activities were completed, and the MQ-9 Acquisition Program Baseline FOT&E completion threshold was successfully met.
1st Quarter FY 2017	In November 2016, an ER Follow-On Contract was awarded which will procure and install ER kits to retrofit the full MQ-9 Block 1 fleet with ER capabilities. The PO awarded the MQ-9 Electrical Safety Improvement Program (ESIP) Follow-On Contract in December 2016 which will complete the MQ-9 Block 1 fleet ESIP upgrades. ACC requested the PO investigate a single software approach for both ACC and AFSOC to minimize fielded software configurations, reduce complexity in the field for operators and maintainers, and rapidly deliver capabilities every 6-12 months with acceptable risk.
June 2017	Initial MQ-9 Block 5 assets and support equipment were successfully deployed in June 2017

	to support Users' combat operations, with the first MQ-9 Block 5 operational combat line flown on June 23, 2017.
March 2018	The Air Force transitioned to an MQ-9 Reaper fleet on March 9, 2018, retiring the MQ-1 Predator at Creech AFB during the MQ-9 Commanders' Summit. The Air Force's 60 global combat lines have since been flown by MQ-9 Reapers.
August 2018	The MQ-9 SPO assembled an MQ-9 Reaper Cyber Security Plan of Action and Milestones (POAM) to assure the MQ-9 Reaper weapon system's cyber resiliency. The SPO has presented the POAM to the leadership of Air Combat Command, US Special Operations Command, and Air Force Special Operations Command, and secured approvals of the plan.
March 2019	The combined MQ-1 Predator and MQ-9 Reaper flying hour total exceeded 4-million hours – an "historical first" for MQ-1 & MQ-9 programs.
June 2019	The Program of Record-only (not including FMS) MQ-9s amassed 2-million total flight hours – another "historical first" for the MQ-9 program
August 2019	ACC decision that Block 50 GCS production is no longer required. The SPO developed a way forward to smartly end the current development contract and best leverage the investment made in the Block 50 GCS.
December 2019	In December 2019, the first Block 5 Exportable weapon systems, to include Block 30 Ground Control Stations, were shipped to Spain.
December 2019	From June 23, 2017 through calendar year 2019, the Block 5 is performing well and as designed. More than 72,000 Block 5 combat hours have been flown since June 2017.

Threshold Breaches

APB Breach	nes		
Schedule Performand Cost O&S Cost Unit Cost	RDT&E Procurement MILCON Acq O&M PAUC APUC	000080000	The MILCON breach was previously reported in the December 2012 SAR.
Nunn-McCu	irdy Breaches		
Current UC	R Baseline		
	PAUC	None	
	APUC	None	
Original UC	R Baseline		
	PAUC	None	
	APUC	None	

Schedule



Sch	Schedule Events						
Events	SAR Baseline Production Estimate	Proc	ent APB duction e/Threshold	Current Estimate			
Milestone B ACAT II	Feb 2004	Feb 2004	Feb 2004	Feb 2004			
Milestone C ACAT II Block 1	Feb 2008	Feb 2008	Feb 2008	Feb 2008			
IOT&E for Block 1	May 2008	May 2008	May 2008	May 2008			
RAA	Sep 2010	Jun 2012	Jun 2012	Jun 2012			
Milestone C ACAT ID Increment 1, Block 5	Mar 2011	Nov 2012	Nov 2012	Nov 2012			
FOT&E for Increment I Block 5	Nov 2012	Dec 2016	Dec 2016	Sep 2016			
FRP Decision for Increment I Block 1 and 5	Mar 2013	N/A	N/A	N/A			
Interim Program Review (IPR)	N/A	Mar 2017	Sep 2017	Sep 2017			

Change Explanations

None

Notes

RAA includes two fixed GCSs, two mobile GCSs, six PMAI Block 1 aircraft, technical orders, support equipment, initial and readiness spares packages, and logistics support.

December 2019 SAR

MQ-9 Reaper

Acronyms and Abbreviations

ACAT - Acquisition Category FOT&E - Follow-On Test and Evaluation FRP - Full Rate Production

GCS - Ground Control Station

IOT&E - Initial Operational Test and Evaluation

PMAI - Primary Mission Aircraft Inventory RAA - Required Assets Available

Track to Budget

General Notes

Program Element 0205219F includes funds not associated with the MDAP. This report only reflects funds associated with the MDAP.

	-		
_			_
п		CY	_

Appr		BA	PE			
Air Force	3600	07	0205219F			
	Proj	ject		Name		
1157	675246	6	MQ-9 Develop	ment and Fielding		
Air Force	3600	07	0305205F			
	Pro	ject		Name		
	674755	5			(Shared) (Sunk)	
Air Force	3600	07	0305219F			
	Proj	ject		Name		
	675143	3	PREDATOR		(Shared) (Sunk)	

Procurement

Appn	ВА	PE		
Air Force	3010 07	0205219F		
	Line Item		Name	
	000075	Other Produc	ction Charges	(Shared)
Air Force	3010 06	0205219F		
	Line Item		Name	
	000999	Initial Spares		(Shared)
Air Force	3010 05	0305205F		
	Line Item		Name	
	PRDT01	MQ-1 Mods		(Shared) (Sunk)
Air Force	3010 04	0305205F		
	Line Item	2 25	Name	
	PRDTA1	Aircraft Procu	urement	(Shared) (Sunk)
Air Force	3010 04	0205219F		
	Line Item	la l	Name	
	PRDTB1	MQ-9		(Shared)
Air Force	3010 05	0205219F		
	Line Item		Name	
	PRDTB2	MQ-9 Mods		(Shared)

MILCON

Appn	BA	PE
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December 2019 SAR

MQ-9 Reaper

Air Force

KWRD143

3300 0205219F 01 **Project** Name BHD000 MQ-9 Operations

(Sunk)

Add RPA Weapons School Facility RKMF113

RPA Fixed Ground Control Station Facility

(Sunk)

Cost and Funding

Cost Summary

		T	otal Acquis	ition Cost			
	B	/ 2008 \$M		BY 2008 \$M	TY \$M		
Appropriation	SAR Baseline Production Estimate	Current Produc Objective/T	ction	Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	778.8	1365.1	1501.6	1379.2	809.9	1488.8	1518.5
Procurement	9824.0	10175.3	11192.8	8530.3	10866.0	11765.5	9642.2
Flyaway				6423.8			7276.0
Recurring	-2		44	6423.8		44	7276.0
Non Recurring				0.0			0.0
Support				2106.5			2366.2
Other Support				794.5			907.2
Initial Spares	-	-	44	1312.0	44		1459.0
MILCON	148.5	53.3	58.6	73.2	158.9	55.6	78.4
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	10751.3	11593.7	N/A	9982.7	11834.8	13309.9	11239.1

APB Breach

Cost Notes

CAPE Cost Risks:

CY 2019 Program Office Estimate completed January 7, 2020

The POE provides adequate resources to execute the program while encountering and mitigating acceptable levels of technical, schedule, and cost risk. The baseline includes the most probable funding and schedule to complete development, retrofit, and production efforts. The estimate includes adequate funding to cover production, however, the variability in aircraft quantities and funding will continue to adversely affect acquisition schedules and unit cost.

Total Quantity						
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate			
RDT&E	3	3	3			
Procurement	388	401	411			
Total	391	404	414			

Quantity Notes

Procurement quantity is the number of MQ-9 Reaper aircraft. Ground Control Stations (GCS) and other equipment costs are included, but not used as a unit of measure.

Cost and Funding

Funding Summary

			Арр	ropriation S	Summary					
FY 2021 President's Budget / December 2019 SAR (TY\$ M)										
Appropriation	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total	
RDT&E	1299.8	50.9	32.3	33.0	33.5	34.2	34.8	0.0	1518.5	
Procurement	8408.2	629.8	290.2	157.4	132.6	11.9	12.1	0.0	9642.2	
MILCON	78.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.4	
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
PB 2021 Total	9786.4	680.7	322.5	190.4	166.1	46.1	46.9	0.0	11239.1	
PB 2020 Total	10067.2	638.8	614.5	785.4	426.0	106.1	0.0	0.0	12638.0	
Delta	-280.8	41.9	-292.0	-595.0	-259.9	-60.0	46.9	0.0	-1398.9	

Funding Notes

			Qu	antity Su	mmary					
	FY 202	1 Preside	ent's Bu	dget / D	ecember	2019 S	AR (TYS	M)		
Quantity	Undistributed	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Development	3	0	0	0	0	0	0	0	0	3
Production	0	387	24	0	0	0	0	0	0	411
PB 2021 Total	3	387	24	0	0	0	0	0	0	414
PB 2020 Total	3	387	12	9	17	2	3	0	0	433
Delta	0	0	12	-9	-17	-2	-3	0	0	-19

Cost and Funding

Annual Funding By Appropriation

		RDT&E Rese			277		
Fiscal Year	The state of the s	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2002		***	149	75	*		7.8
2003							12.8
2004							20.
2005	124					-	56.8
2006						(44)	10.
2007				4			34.0
2008		***		**			55.9
2009		-		154	-		38.
2010	0						102.8
2011						-	136.6
2012				**			106.
2013	7			***			130.
2014			1.4				103.
2015	-					-	141.
2016					44	-	127.
2017	1847						118.4
2018							87.5
2019							7.5
2020			1420	-			50.9
2021	-	***	144	-			32.3
2022		-		-	1 1		33.0
2023			3-4				33.5
2024	-		146	5-4			34.2
2025							34.8
Subtotal	3						1518.

2002 2003 2004	Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	BY 2008 \$7 Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2003 2004							
2004	-	**			199	CHA.	8.9
				**			14.4
2222		**			1		22.9
2005	(44)					.22	60.7
2006							10.5
2007		**					34.4
2008							55.4
2009						77	37.8
2010							99.4
2011	22	12	44		44	- 22	129.6
2012				-64		144	99.5
2013						-11	120.0
2014			4	4	4		93.4
2015		12				12	126.7
2016				la.		122	112.7
2017			12	2.		144	102.4
2018						44	74.1
2019	-	12		144			6.2
2020							41.5
2021		**			24		25.8
2022							25.8
2023		-					25.7
2024		3-7					25.7
2025							25.7

FY 2002 RDT&E includes \$7.8M (TY\$) of Defense Emergency Response Funds.

		3010 Proci	Annual Fu urement Aircraf		Air Force		
	TY \$M						
Fiscal Year	Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2002	4	60.4	100	1,44	60.4		60.
2003	4	36.8			36.8		36.
2004	5	67.7			67.7	2.8	70.
2005	5	85.8	2.2	**	88.0	5.3	93.
2006	2	32.2	33.0		65.2	44.7	109.
2007	12	109.4	50.6		160.0	151.6	311.
2008	28	214.2	51.7		265.9	80.5	346.
2009	24	212.3	138.4	**	350.7	186.4	537.
2010	24	263.8	24.1		287.9	245.6	533.
2011	48	429.8	51.9		481.7	140.3	622.
2012	48	515.4	177.8	22	693.2	211.6	904.
2013	39	583.2	145.4		728.6	150.5	879.
2014	23	281.4	69.1		350.5	124.0	474.
2015	24	411.0	101.4		512.4	166.8	679.
2016	33	574.2	173.4		747.6	203.1	950.
2017	24	353.3	183.7		537.0	114.8	651.8
2018	16	215.4	147.1		362.5	177.0	539.
2019	24	356.2	200.6	144	556.8	50.3	607.
2020	24	416.7	128.7	-	545.4	84.4	629.
2021			205.9		205.9	84.3	290.
2022	-		82.8		82.8	74.6	157.
2023			65.0		65.0	67.6	132.
2024		34	11.9		11.9		11.
2025		**	12.1		12.1		12.
Subtotal	411	5219.2	2056.8		7276.0	2366.2	9642.

		3010 Proci	Annual Fu urement Aircraf		Air Force				
		BY 2008 \$M							
Fiscal Year	ar Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program		
2002	4	68.0		1.44	68.0		68.0		
2003	4	40.8		**	40.8		40.8		
2004	5	73.1			73.1	3.0	76.1		
2005	5	90.0	2.3		92.3	5.6	97.9		
2006	2	32.9	33.7		66.6	45.7	112.3		
2007	12	108.9	50.4		159.3	150.9	310.2		
2008	28	209.8	50.6		260.4	79.0	339.4		
2009	24	204.5	133.4		337.9	179.5	517.4		
2010	24	249.3	22.8		272.1	232.2	504.3		
2011	48	399.8	48.3		448.1	130.5	578.6		
2012	48	472.3	162.9	44	635.2	193.9	829.1		
2013	39	523.7	130.7		654.4	135.1	789.5		
2014	23	249.1	61.2	_	310.3	109.7	420.0		
2015	24	358.9	88.6		447.5	145.7	593.2		
2016	33	492.1	148.6		640.7	174.1	814.8		
2017	24	296.8	154.3		451.1	96.5	547.6		
2018	16	177.0	120.9		297.9	145.5	443.4		
2019	24	287.0	161.6	144	448.6	40.6	489.2		
2020	24	329.3	101.8		431.1	66.7	497.8		
2021		**	159.6	-	159.6	65.3	224.9		
2022	-	**	62.9		62.9	56.7	119.6		
2023			48.5		48.5	50.3	98.8		
2024		34	8.7		8.7		8.7		
2025			8.7		8.7		8.7		
Subtotal	411	4663.3	1760.5	-	6423.8	2106.5	8530.3		

FY 2002 Procurement includes \$29.1M (TY\$) of Defense Emergency Response Funds.

End Item Recurring Flyaway related costs include aircraft, Multi-spectral Targeting System-B (MTS-B) and government furnished equipment.

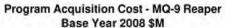
Non End Item Recurring Flyaway costs include retrofit, Ground Control Stations (GCS) and communications. Retrofits include GCS and other miscellaneous communications and sensor retrofits.

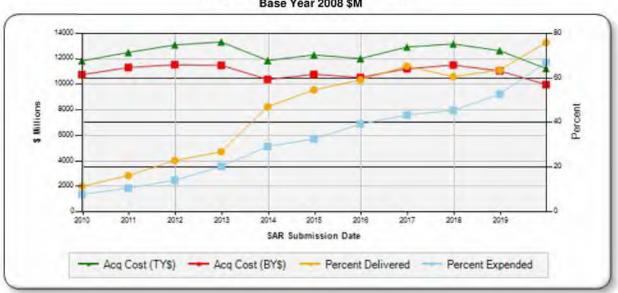
Annual Fur 3300 MILCON Military C	
4000	TY \$M
Fiscal Year	Total Program
2009	44.5
2010	2.7
2011	8.4
2012	
2013	4
2014	18.5
2015	-
2016	-
2017	
2018	4.3
Subtotal	78.4

	Funding ry Construction, Air Force
- Control	BY 2008 \$M
Fiscal Year	Total Program
2009	43.0
2010	2.6
2011	7.8
2012	
2013	
2014	16.3
2015	¥-
2016	
2017	
2018	3.5
Subtotal	73.2

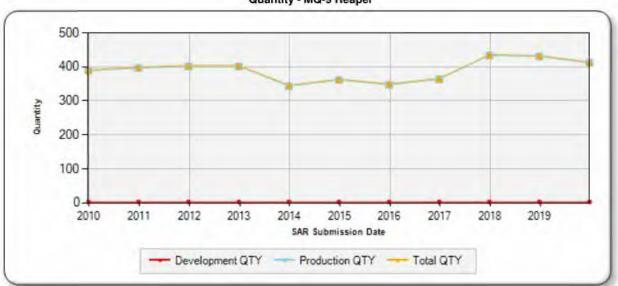
Charts

MQ-9 Reaper first began SAR reporting in December 2009

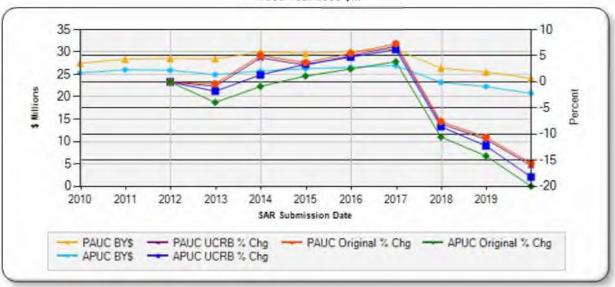




Quantity - MQ-9 Reaper



Unit Cost - MQ-9 Reaper Base Year 2008 \$M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks

Milestone C (September 2012)

 In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is For Official Use Only.

Current Estimate (December 2019)

 In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is For Official Use Only.

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis

Current Baseline Estimate (April 2017)

Total Acquisition Cost (BY 2008 \$M) - \$11,593.7M (Qty 404); PAUC - \$28.697M (Qty 404); APUC - \$25.375M (Qty 401) The April 2017 APB was a schedule only APB and did not include cost changes. The Acquisition Cost, PAUC, and APUC associated with the April 2017 APB was from the December 2012 APB which was supported by a Service Cost Position (SCP), signed September 10, 2012 for the MQ-9 Reaper Program Milestone C decision (Qty 404).

Original Baseline Estimate (February 2012)

Total Acquisition Cost (BY 2008 \$M) - \$11,541.3M (Qty 404); PAUC - \$28.568M (Qty 404); APUC - \$25.940M (Qty 401)

Revised Original Estimate (N/A)

None

Current Procurement Cost (December 2019)

1. Total Acquisition Cost (BY 2008 \$M) - \$9,979M (Qty 414); PAUC - \$24.104M (Qty 414); APUC - \$20.747M (Qty 411) Risks: The Program Office Estimate (POE) completed on January 7, 2020 provides adequate resources to execute the program while encountering and mitigating acceptable levels of technical, schedule, and cost risk. The baseline includes the most probable funding and schedule to complete development, retrofit, and production efforts. The estimate includes adequate funding to cover production, however, the variability in aircraft quantities and funding will continue to adversely affect acquisition schedules and unit cost.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	11/21/2012	11/21/2012
Approved Quantity	48	62
Reference	Milestone C ADM	Milestone C ADM
Start Year	2013	2013
End Year	2014	2014

The Current Total LRIP Quantity is more than 10% of the total production quantity due to Congressional approval to procure 39 Block 5 aircraft in FY 2013 and 23 in FY 2014. The change from the initial LRIP quantity to current LRIP quantity is due to 14 aircraft added to the FY 2013 and FY 2014 profile; eight aircraft added by Congress in FY 2014 and approval to purchase six additional aircraft based on budget.

Notes

The MQ-9 Reaper program was broken into two blocks; Block 1 aircraft, providing initial capability to meet the early fielding directed by Congress, and Block 5 aircraft which provides additional power, a redesigned avionics bay, and encrypted communications. The program procured 195 Block 1 aircraft prior to the planned procurement of 171 Block 5 aircraft starting in FY 2013. The LRIP quantities reported in the table above reflect the procurement of Block 5 aircraft only.

Foreign Military Sales

Notes

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is For Official Use Only;

MQ-9 Reaper

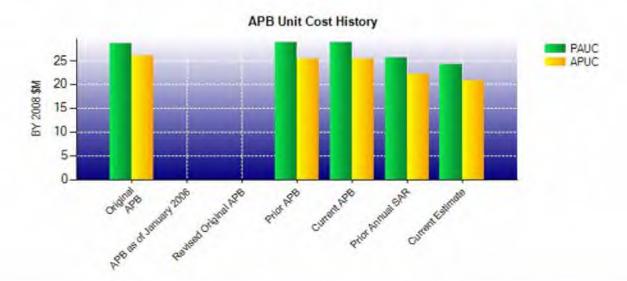
Nuclear Costs

None

Unit Cost

	BY 2008 \$M	BY 2008 \$M	
Item	Current UCR Baseline (Apr 2017 APB)	Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Co	st		
Cost	11593.7	9982.7	
Quantity	404	414	
Unit Cost	28.697	24.113	-15.97
Average Procurement Unit C	Cost		
Cost	10175.3	8530.3	
Quantity	401	411	
Unit Cost	25.375	20.755	-18.21
Original	UCR Baseline and Current Estimate	(Base-Year Dollars)	
	BY 2008 \$M	BY 2008 SM	

Original UCR Base	eline and Current Estimate	(Base-Year Dollars)	
	BY 2008 \$M	BY 2008 \$M	
Item	Original UCR Baseline (Feb 2012 APB)	Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	11541.3	9982.7	
Quantity	404	414	
Unit Cost	28.568	24.113	-15.59
Average Procurement Unit Cost			
Cost	10402.1	8530.3	
Quantity	401	411	
Unit Cost	25.940	20.755	-19.99



APB Unit Cost History										
D. Company	D.1.	BY 2008 \$M		TY \$M						
Item	Date	PAUC	APUC	PAUC	APUC					
Original APB	Feb 2012	28.568	25.940	32.396	29.604					
APB as of January 2006	N/A	N/A	N/A	N/A	N/A					
Revised Original APB	N/A	N/A	N/A	N/A	N/A					
Prior APB	Dec 2012	28.697	25.375	32.945	29.340					
Current APB	Apr 2017	28.697	25.375	32.945	29.340					
Prior Annual SAR	Dec 2018	25.533	22,259	29.187	25.594					
Current Estimate	Dec 2019	24.113	20.755	27.148	23.460					

Program Unit Cost decreases are attributable to decreased Ground Control Station buys and Congressional funding reductions.

SAR Unit Cost History

PAUC
Current Estimate

					Current Es				3.805.00.00
Initial APUC Production	Changes						APUC Current		
Estimate	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	Estimate

SAR Baseline History					
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate	
Milestone A	N/A N/A		N/A	N/A	
Milestone B	N/A	N/A	Feb 2004	Feb 2004	
Milestone C	N/A	N/A	Feb 2008	Feb 2008	
IOC	N/A N		Sep 2010	Jun 2012	
Total Cost (TY \$M)	N/A	N/A	11834.8	11239.1	
Total Quantity	N/A	N/A	391	414	
PAUC	N/A	N/A	30.268	27.148	

The Milestone C schedule event above reflects the ACAT II Block 1 Milestone C decision. On November 21, 2012 the USD (AT&L) signed an ADM approving the ACAT ID Increment 1, Block 5 Milestone C and delegating MDA to the Air Force.

The April 2017 APB was a schedule only APB. It did not include any cost changes. The PAUC and APUC associated with the April 2017 APB was from the December 2012 APB.

Cost Variance

Summary TY \$M						
Item	RDT&E	Procurement	MILCON	Total		
SAR Baseline (Production Estimate)	809.9	10866.0	158.9	11834.8		
Previous Changes						
Economic	-10.2	+131.5	+4.2	+125.5		
Quantity		+957.4		+957.4		
Schedule	+84.3	+165.3		+249.6		
Engineering	+530.1	+360.7	+3.2	+894.0		
Estimating	+171.2	-2395.2	-87.9	-2311.9		
Other		100		-		
Support	-31.3	+919.9		+888.6		
Subtotal	+744.1	+139.6	-80.5	+803.2		
Current Changes						
Economic	-0.1	-5.7		-5.8		
Quantity		-406.6		-406.6		
Schedule		-6.2		-6.2		
Engineering	+34.8	-2.9	-	+31.9		
Estimating	-70.2	-444.9		-515.1		
Other	4-		42	-		
Support		-497.1		-497.1		
Subtotal	-35.5	-1363.4	92	-1398.9		
Total Changes	+708.6	-1223.8	-80.5	-595.7		
Current Estimate	1518.5	9642.2	78.4	11239.1		

	Summary BY 2008 \$M					
Item	RDT&E	Procurement	MILCON	Total		
SAR Baseline (Production Estimate)	778.8	9824.0	148.5	10751.3		
Previous Changes						
Economic	1.79			-		
Quantity	4-	+775.8	44	+775.8		
Schedule	+66.4	+54.5	-0.1	+120.8		
Engineering	+457.5	+214.2	+2.7	+674.4		
Estimating	+135.9	-2006.3	-77.9	-1948.3		
Other						
Support	-27.3	+709.0		+681.7		
Subtotal	+632.5	-252.8	-75.3	+304.4		
Current Changes						
Economic	**	3-4		-		
Quantity		-307.0		-307.0		
Schedule		-1.1		-1.1		
Engineering	+25.7	-2.2		+23.5		
Estimating	-57.8	-342.8	22.	-400.6		
Other				-		
Support	142	-387.8	44	-387.8		
Subtotal	-32.1	-1040.9		-1073.0		
Total Changes	+600.4	-1293.7	-75.3	-768.6		
Current Estimate	1379.2	8530.3	73.2	9982.7		

Previous Estimate: December 2018

RDT&E		i
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.1
Revised estimate to realign funding between the MQ-9 ACAT IC and ACAT II programs to reflect actual execution. (Estimating)	-22.2	-26.2
Revised estimate to reflect the cancellation of Block 50. (Estimating)	-22.9	-28.7
Baseline Extension to include FY 2025 requirements. (Engineering)	+25.7	+34.8
Reduced funding due Congressional Rescission. (Estimating)	-12.7	-15.3
Refined estimate to align to the FY 2021 President's Budget. (Estimating)	-0.1	-0.1
Adjustment for current and prior escalation. (Estimating)	+0.1	+0.1
RDT&E Subtotal	-32.1	-35.5

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-5.7
Total Quantity variance resulting from a decrease of 19 MQ-9s from 430 to 411. Quantity variance in previous report was a decrease of 3 MQ-9s from 433 to 430. (Subtotal)	-231.6	-307.5
Quantity variance resulting from a decrease of 19 MQ-9s from 430 to 411. Quantity variance resulting from a decrease of 31 MQ-9s from 430 to 399. (Quantity)	(-243.6)	(-323.4)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(-1.1)	(-1.5)
Allocation to Engineering resulting from Quantity change. (Engineering) (QR)	(-2.2)	(-2.9)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(+15.3)	(+20.3)
Additional quantity variance to reflect program office unit cost estimates. (Quantity)	-63.4	-83.2
Acceleration of procurement buy profile due to additional units procured in FY 2020. (Schedule)	0.0	-4.7
Revised estimate to reflect FY 2025 baseline extension. (Estimating)	+8.7	+12.1
Revised estimate due to Congressional marks in FY 2020. (Estimating)	-118.3	-148.2
Revised estimate to include MQ-9 Production Line Shutdown activities and removal of production support costs. (Estimating)	+115.8	+151.1
Revised estimate to incorporate reduction in funding due to the cancelation of Block 50 Ground Control Station Procurement. (Estimating)	-265.9	-351.9
Revised estimate to realign funding between the MQ-9 ACAT IC and ACAT II programs and to reflect actual and planned execution. (Estimating)	-100.1	-130.7
Adjustment for current and prior escalation. (Estimating)	+1.7	+2.4
Adjustment for current and prior escalation. (Support)	+0.9	+0.8
Decrease in Other Support due to the reduction in funding to reflect Congressional rescission, realignment between the MQ-9 ACAT IC and ACAT II programs, and to reflect actual and planned execution. (Support)	-108.3	-141.2
Decrease in Initial Spares due to the reduction of 19 MQ-9 aircraft, cancelation of Block 50 Ground Control Station procurement, reduction in funding to reflect Congressional rescission, realignment between the MQ-9 ACAT IC and ACAT II programs, and to reflect actual and planned execution. (Support)	-280.4	-356.7

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MQ-9 Reaper December 2019 SAR

Procurement Subtotal -1040.9 -1363.4

(QR) Quantity Related

Deliveries and Expenditures

Deliveries					
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered	
Development	3	3	3	100.00%	
Production	263	311	411	75.67%	
Total Program Quantity Delivered	266	314	414	75.85%	

Expended and Appropriated (TY	\$M)		
Total Acquisition Cost	11239.1	Years Appropriated	19
Expended to Date	7534.1	Percent Years Appropriated	79.17%
Percent Expended	67.03%	Appropriated to Date	10467.1
Total Funding Years	24	Percent Appropriated	93.13%

The above data is current as of February 10, 2020.

Notes

MQ-9 Production Deliveries. As of December 31, 2019, 116 of 195 new MQ-9 Block 5 production aircraft deliveries are complete, with production deliveries scheduled through FY 2023. The FY 2016 production contract has delivered 18 of 36 aircraft as of December 31, 2019. The MQ-9 Block 5 FY 2019 production buy for 24 additional Block 5 weapon systems was awarded on September 12, 2019, in the same year as the funding was appropriated, to help usher required updated capabilities to warfighters! The MQ-9 Team released a Request for Proposal on April 2, 2019 for the FY 2020 Agile Reaper Enterprise Solution (ARES) indefinite-delivery/indefinite-quantity, priced quantity curve production contract. The General Atomics Aeronautical Systems, Incorporated proposal was received on October 31, 2019, with the ARES contract award planned by September 30, 2020

MQ-9 Retrofit Deliveries. As of December 31, 2019, 57 of the total 118 planned MQ-9 Block 1 Extended Range (ER) retrofits were completed. The total active fleet of Block 1 ER aircraft remains at 99. During December 2019, five Block 5 ER retrofits were completed bringing the total Block 5 ER fleet to 33 aircraft.

Ground Control System Production and Modification Deliveries. As of December 31, 2019, 54 Block 30 GCS new production cockpit deliveries have completed and 45 Block 30 GCS retrofit cockpit deliveries have been completed, yielding a total of 99 GCS Block 30s

Operating and Support Cost

Cost Estimate Details

Date of Estimate: January 07, 2020
Source of Estimate: O&S Cost Estimate

Quantity to Sustain: 366
Unit of Measure: Aircraft
Service Life per Unit: 20.00 Years

Fiscal Years in Service: FY 2002 - FY 2044

The current O&S estimate includes a quantity to sustain of 366 aircraft and was completed prior to release of the FY 2021 President's Budget which supports 414 aircraft.

The O&S costs are from the current O&S estimate which is based on historical costs and estimated future costs through FY 2044. The MQ-9 Reaper has been flying operations since 2006.

Historical costs are obtained from monthly Contractor Logistics Support (CLS) cost reports, Air Force Total Ownership Cost (AFTOC) actuals, and other data sources. Future costs are based on flying hour projections, manpower projections, number of operating locations, and applicable rates and factors. Flying hours are based on the number of anticipated Combat Lines (CLs). The total MQ-9 Reaper life cycle flying hours are based on the Air Combat Command (ACC) MQ-9 Reaper standup plan, ACC projected flight hours per CL, and the defined MQ-9 Reaper life cycle. The attrition rate is based upon the official Air Force Studies and Analysis MQ-9 Reaper attrition model. Quantity of aircraft per CL will continue to vary based on mission requirements and future operations.

Cost Analysis Improvement Group (CAIG) element 4.0 Sustaining Support includes estimated cost of the CLS support for GCS and other support equipment derived from historical actuals level of support needed from various contractors and adjusted using appropriate inflation factors.

Unit-Level Manpower costs are estimated using manpower projections. Unit Operations cost factors include fuel, training munitions, and temporary duty costs. Maintenance costs include Operational-level, Depot-level (D-level), and Government Furnished Equipment repair. Sustaining support includes D-level sustaining engineering and program management and system specific training derived from actual costs from the AFTOC database, and converted to a cost per flying hour. Continuing System Improvements costs include Reliability & Maintainability Enhancements and Software Maintenance supported via the CLS contract. Indirect Support costs are based on factors from Air Force Instruction 65-503 table A56-1, which were applied against manpower projections.

Sustainment Strategy

Sustainment of the MQ-9 Reaper systems is currently provided through CLS contracts with General Atomics, Aeronautical Systems Incorporated (GA-ASI), and Raytheon. The CLS contracts include program management, logistics support, configuration management, technical manuals, software maintenance, engineering technical services, contractor field service representative support, contractor inventory control point, spares management, depot repair, flight operations support, reliability and maintainability studies, maintenance data collection/entry and depot field maintenance. Supported organizations include ACC, Air National Guard, Air Force Special Operations Command, Air Education and Training Command. The Program Office is working to transition portions of CLS to Public Private Partnerships which leverages original equipment manufacturer and organic capabilities. Currently, the Air Force Sustainment Center has Public Private Partnership Agreements with GA-ASI and L3 Communications. Recently, the partnership with Fleet

December 2019 SAR

Readiness Center-Southeast and Raytheon has converted to fully organic with Raytheon providing support.

Antecedent Information

The antecedent program for the MQ-9 Reaper is the MQ-1 Predator. The MQ-1 Predator O&S costs are based on the current POE which utilizes the same methodology as the MQ-9 Reaper O&S estimate. The MQ-1 Predator O&S costs are based on 268 aircraft and a service life of 21 years, with a planned divestiture of the program within the FYDP.

The MQ-1 Predator total BY 2008 O&S figure may be computed by multiplying the average cost per flying hour for each cost element category (totaling \$3.667K) by the total flying hours of the MQ-1 Predator program (2,058,727). The total MQ -1 Predator O&S figure did not change since last reported in the December 2016 SAR due to the cost estimate no longer being updated with sunset in March 2018. From a cost per flying hour perspective the MQ-9 Reaper's costs vary slightly from its antecedent program, the MQ-1 Predator.

Annual O&S Costs BY2008 \$M					
Cost Element	MQ-9 Reaper Average Annual Cost Per Aircraft	MQ-1 Predator (Antecedent) Average Annual Cost Per Aircraft			
Unit-Level Manpower	1.537	0.429			
Unit Operations	0.665	0.297			
Maintenance	1.499	0.422			
Sustaining Support	1.433	0.009			
Continuing System Improvements	0.233	0.105			
Indirect Support	0.643	0.081			
Other	0.000	0.000			
Total	6.010	1,343			

The average cost per flying hour for an MQ-9 Reaper is \$3.211K. The flying hour projection is based on the updated flying hour profile received from Air Combat Command. The Program Office utilized a bottoms-up cost estimating approach to estimate the MQ-9 Reaper life cycle cost.

		Total O&S	Cost \$M	
Item	MQ-9 Reaper Current Production APB Objective/Threshold			MO 1 Dradator
			Current Estimate	MQ-1 Predator (Antecedent)
Base Year	47215.4	51936.9	43990.7	7570.0
Then Year	65058.9	N/A	49565.2	N/A

Equation to Translate Annual Cost to Total Cost

The average annual cost per aircraft is derived by dividing the total life cycle cost by the number of aircraft and total service life years. \$43,990.7M (BY O&S cost) / 366 (total aircraft) / 20 (total service life years) = \$6.010M.

O&S Cost Variance

Category	BY 2008 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2018 SAR	42802.6	
Programmatic/Planning Factors	0.0	5
Cost Estimating Methodology	0.0	
Cost Data Update	1188.1	Updated O&S Cost Tables, increased DAS-4 CLS costs, Increased Simulator sustainment costs
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	1188.1	
Current Estimate	43990.7	

Disposal Estimate Details

Date of Estimate: January 07, 2020
Source of Estimate: O&S Cost Estimate

Disposal/Demilitarization Total Cost (BY 2008 \$M): 14.0

The MQ-9 Reaper disposal cost estimate is based on the current O&S estimate and assumes cold storage. The estimate utilizes various factors such as aircraft quantity and weights to calculate shipping costs, demolition costs, and disposal of hazardous materials.